map of the Mobile and Alabama river region and an index accompany the text.

Some of the copper pendants figured are of exceeding interest. Pipes of earthenware, fish-hooks of shell and bone, disks probably for the ear lobe, incised shell disks and the decoration on the pottery are all worthy of study.

The author states that although the attention given by him to the Mobile and Alabama rivers does not compare with that accorded by him to the St. Johns river, Florida, and to the Georgia coast, yet it was fully ample to indicate that mounds along these rivers were of rare occurence and, as a rule, insignificant in size. He suspects that at many places the people were buried in cemeteries and that these being unmarked have largely escaped notice. The borders of Mobile and Alabama rivers were probably not so thickly settled as the St. Johns. This may be due to the fact that shad, bass and shell-fish are less abundant in the former. The shellheaps are insignificant compared with those covering acres along the St. Johns. Swamps and malaria may also have had their influence.

Quartz is more used than chert for points, a reverse of the facts for Florida and Georgia coast. The earthenware, although good and often tempered with shell, was not striking in type. In some of it Tennessee and Mississippi Valley influence is suggested.

The gritty ware of lower Georgia and its complicated stamp decorations were rare, but some sherds bearing decorations of the kind found in Georgia, Carolina and upper Florida were found. None of the highest type of gulf-ware was met and perforations for suspension were not common.

Plural burials of uncremated bones in single urns proved a fact new to science for the southeast, although plural burials of cremated bones may have been known. One case of cremation was found which, while almost totally foreign to this region, is frequently met in Florida and Georgia.

Mr. Moore's investigations are the first of a systematic nature to be carried on along the Mobile and the Alabama. This record of the results is a most happy addition to the already valuable Floridian library from his pen.

Harlan I. Smith.

A NEW PALEOLITHIC STATION.

A discovery of unusual importance is announced in the *Correspondenz-Blatt der deutschen Gesellschaft für Anthropologie, Ethnologie und Urgeschichte* for March. The announcement, as well as the discovery, is by Professor Gorjanović-Kramberger, Director of the National Museum of Geology and Paleontology at Agram, capital of Croatia, Austria-Hungary. The find was made on the bank of the Krapina, a small stream in northern Croatia, and consists of the paleolithic remains of man (pieces of the jaw bone with teeth, isolated teeth, parietal and occipital fragments, etc.), and chipped implements of stone, associated with Rhinoceros tichorhinus, Bos primigenius, Ursus spelæus, Sus, Castor fiber, etc.

These culture-bearing deposits, nine zones in all, occur in what might be called a rock shelter of stratified Miocene sandstone. Of the nine zones, the lowest only shows evidence of stream-action, and that at a time when the water-level was considerably higher than now. The eight superimposed layers are products of weathering from the overhanging Miocene sandstone. The thickness of the entire deposit measures 8.5 meters. The above mentioned animal remains occur throughout the series of layers, at the same time, on account of the relative frequency of certain remains, three faunal horizons are readily determined:

1 Castor fiber,
3-4 Homo sapiens,
9 Ursus spelæus.

It is pointed out that horizon 3–4 contains burnt human as well as animal bones. The bones are bright yellow and very friable, the phalanges and teeth alone being well preserved. The station has produced in all, more than one thousand fragments of bone. Unfortunately, the preliminary report gives little idea as to the character of the industry except to say that the implements are angular pieces of jasper and opal.

The appearance of charcoal, ashes, burnt sand, stone implements and bone fragments all the way from the second to the ninth and topmost layer, and the relatively large proportion of the human to the animal remains, will tend to increase the interest in Dr. Gorjanović-Kram-

berger's forthcoming, detailed and fully illustrated account.

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*CERTAIN LAWS OF VARIATION.**

IN a former paper† it was shown that the ova of the Echinoid *Strongylocentrotus lividus* were extraordinarily sensitive to their environmental conditions at the time of impregnation. For instance, by keeping the mixed ova and sperm in water at about 26° or 28° C. for an hour, the plutei obtained after eight days' development were some 5 per cent. smaller than those from ova kept at about 20° at the time of impregnation.

These observations were repeated and confirmed, in the case of *Sphærechinus granularis* as well as *Strongylocentrotus*, and others were made upon the reaction of *Strongylocentrotus* to environment in the later stages of their development. Thus after keeping the ova at a normal temperature for an hour at the time of impregnation, a portion of them was exposed to an abnormal temperature. After a few hours some of these were re-transferred to water at a normal temperature, and kept there for the remainder of development. A few hours later, some more of them were transferred, and so on. By measuring the larvæ after six or eight days' growth, the effect produced by various periods of exposure was determined. When the 'normal' temperature was 20° and the abnormal about 8°, it was found that the larvæ were diminished on an average 1.3 per cent. for each hour's exposure between the end of the 1st to the end of the 6th hour after impregnation; 0.3 per cent. for each hour between the 6th and 10th hours; and 0.2 per cent. for each hour between the 10th and 21st hours. When the 'normal' temperature was about 13° and the 'abnormal' about 20°, an increase in size was produced, amounting to 1.1 per cent. per hour during the 5th hour after impregnation; 0.4 per cent. during the 14th hour; 0.13 per cent. during the 46th hour, and 0.01 per cent. during the 120th hour. That is to say, in each case *the effect of temperature on the growth diminished regularly and rapidly from the time of impregnation onwards.*

When the ova were exposed to an abnormal temperature of 26°, an adverse effect of 4 per cent. was per hour produced during the first three hours. For the next four hours the effect was almost *nil*, and after that a *favorable* effect on growth ensued. This was about 0.4 per cent. per hour for the 16th hour, and 0.01 per cent. for the 80th hour. This change of reaction was accounted for by the fact that the fatal temperature, and therefore also the temperatures unfavorable to growth, rise during development. Thus the death temperature is 28.5° for ova, 33.5° for four hours' blastulæ, 36.5° for 12 hours' blastulæ, and 40.3° for six days' plutei.

The effect of change of salinity on the growth was also found to diminish rapidly with progress of development, hence probably a similar relationship would show itself for other conditions of environment.

What is true for echinoids is probably true for most other organisms, or is, in fact, a law of general application. Thus in man the rate of growth during the third week of embryonic existence is about 2400 times greater than between the 13th and 19th years of post-natal development. The reaction to environment must also be much greater during the earlier period, therefore, though not in the same proportion. Thus, in that the variability diminishes considerably during development—Minot has shown that it becomes halved through the post-natal growth of guinea-pigs—retardations or accelerations of growth produced in the young animals must also become partly wiped out by the time the adult stage is reached.

By splitting up into groups the 20,600 measurements which have been made from time to time on *Strongylocentrotus* larvæ, according to the amount of effect which had been produced in their size by varying degrees of favorable and unfavorable environment, and by determining the average variability of the larvæ in each group, it was sought to prove the existence of a law of variability. This may be worded as follows: "An organism varies least

* Abstract of a paper read before the Royal Society on March 29, 1900, by Dr. H. M. Vernon, Fellow of Magdalen College, Oxford.

† *Phil. Trans.*, B, 1895, p. 577.